



US009636945B2

(12) **United States Patent**  
**Mochinaga et al.**

(10) **Patent No.:** **US 9,636,945 B2**

(45) **Date of Patent:** **May 2, 2017**

(54) **BEARING DEVICE FOR WHEEL**

(56) **References Cited**

(71) Applicant: **NTN CORPORATION**, Osaka (JP)

U.S. PATENT DOCUMENTS

(72) Inventors: **Shuji Mochinaga**, Shizuoka (JP);  
**Takayuki Norimatsu**, Shizuoka (JP)

2009/0245935 A1\* 10/2009 Kamikawa ..... B60B 7/0013  
403/359.1  
2010/0215302 A1\* 8/2010 Torii ..... B60B 27/0005  
384/490

(73) Assignee: **NTN CORPORATION**, Osaka (JP)

(Continued)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **14/906,030**

JP 2009-97557 5/2009  
JP 2009-270627 11/2009  
JP 2011-38561 2/2011  
JP 2012-62013 3/2012

(22) PCT Filed: **Jul. 2, 2014**

(86) PCT No.: **PCT/JP2014/067640**

OTHER PUBLICATIONS

§ 371 (c)(1),  
(2) Date: **Jan. 19, 2016**

International Search Report issued Sep. 16, 2014 in International (PCT) Application No. PCT/JP2014/067640.

(87) PCT Pub. No.: **WO2015/015992**

(Continued)

PCT Pub. Date: **Feb. 5, 2015**

(65) **Prior Publication Data**

*Primary Examiner* — Thomas R. Hannon

US 2016/0159144 A1 Jun. 9, 2016

(74) *Attorney, Agent, or Firm* — Wenderoth, Lind & Ponack, L.L.P.

(30) **Foreign Application Priority Data**

(57) **ABSTRACT**

Jul. 31, 2013 (JP) ..... 2013-158956

(51) **Int. Cl.**

**F16C 35/06** (2006.01)  
**B60B 27/00** (2006.01)  
**F16D 1/06** (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ..... **B60B 27/0026** (2013.01); **B60B 27/0042** (2013.01); **F16C 19/186** (2013.01);  
(Continued)

(58) **Field of Classification Search**

CPC ..... B60B 27/0026; B60B 27/0042; F16C 19/186; F16C 35/0635

See application file for complete search history.

A bearing device for a wheel includes a bearing. The bearing includes outer and inner members and double-row rolling elements. The bearing has a constant velocity universal joint coupled thereto in a torque transmittable manner by fitting a stem section of an outer joint member to a shaft hole of a hub wheel, in which the stem section of the outer joint member is press-fitted to the shaft hole of the hub wheel, and shapes of only the circumferential side wall portions of each of a plurality of convex portions are transferred to the shaft hole, to thereby define a convex and concave fitting portion in which close contact is achieved at an entire contact portion between the plurality of convex portions and the plurality of concave portions.

**6 Claims, 11 Drawing Sheets**

